(12) UK Patent Application (19) GB (11) 2 132 019 A

(21) Application No 8234870
(22) Date of filing 7 Dec 1982
(43) Application published 27 Jun 1984
(51) INT CL³
H01G 9/04
B23K 20/00
B23P 17/00
(52) Domestic classification
H1M 3B2X 3B3A 3B4A 3X BB CF
B3A 50
B3R 10 14 17X 6
U1S 1469 2060 B3A B3R H1M
(56) Documents cited
None
(58) Field of search
H1M
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(54) Electrolytic capacitor manufacture

(57) A fan-folded anode foil 2 is interleaved orthogonally with a fan-folded cathode 1 foil. Direct contact between the foils is prevented by separator sleeves 5 placed around one of the foils. Alternate folds of anode foil project from one side of the resulting stack and are cold welded to tabbing 7 while those of the cathode foil project from an adjacent side and are welded to tabbing 8.

Fig.1.

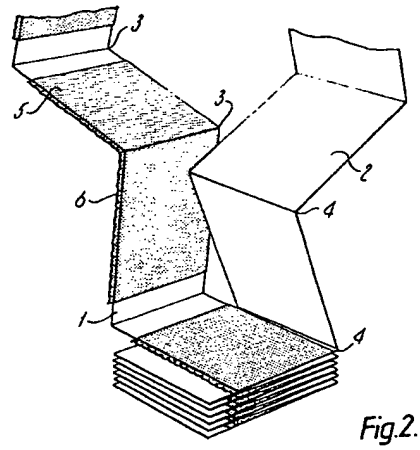
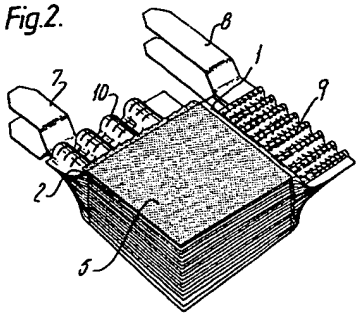


Fig.2.



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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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Fig.1.

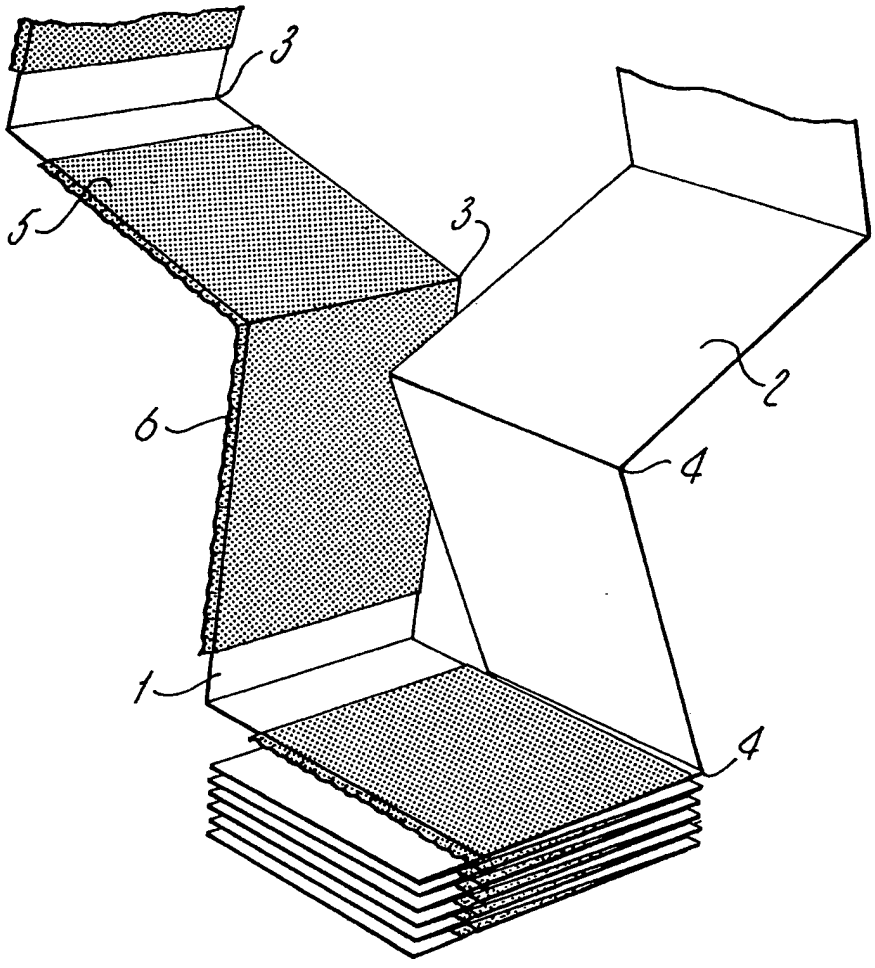


Fig.2.

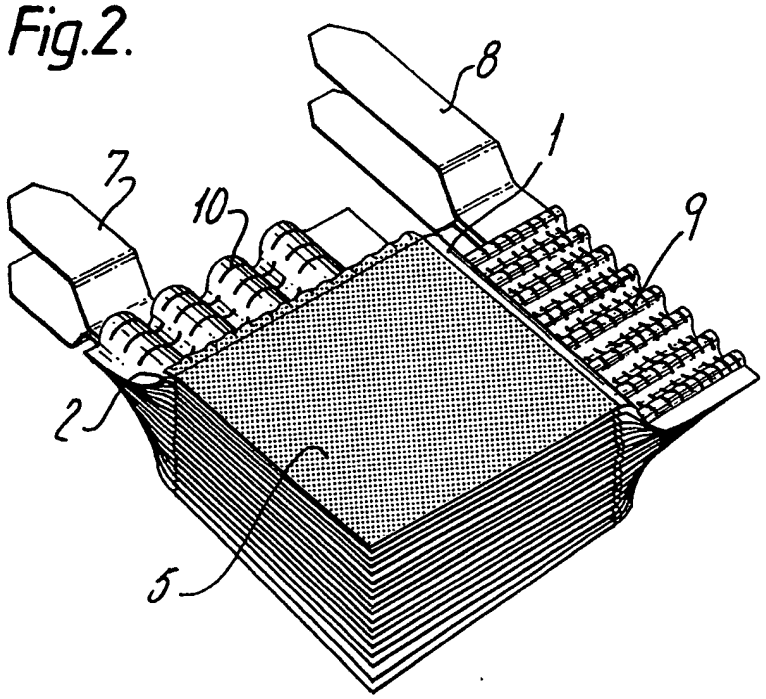
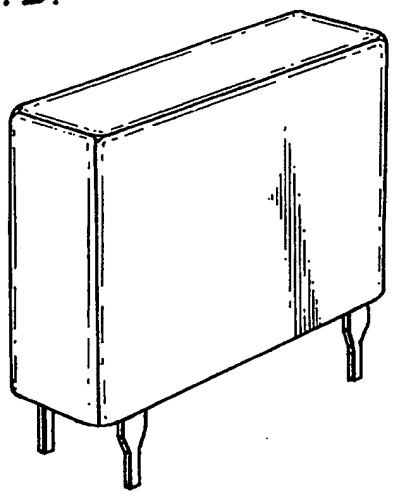


Fig.3.



SPECIFICATION

Electrolytic capacitor manufacture

This invention relates to electrolytic capacitors and is particularly concerned with a design affording a relatively low inductance configuration.

According to the present invention there is provided an electrolytic capacitor provided with fan-folded anode and cathode foils that are interleaved orthogonally together with electrolyte-absorbent electrically insulating separator material to prevent direct electrical contact between the two foils.

There follows a description of an aluminium electrolytic capacitor embodying the invention in a preferred form. The description refers to the accompanying drawings in which:

Figure 1 depicts the assembly of the anode and cathode foils of the capacitor,

Figure 2 depicts the capacitor after the attachment of tabbing to its foils, and

Figure 3 depicts the completed capacitor.

Referring to Figure 1 a cathode foil 1 and an anode 2 are each folded in fan-fold fashion at regular intervals along their length. The interval between consecutive folds 3 on the cathode foil is somewhat greater than the width of the anode foil, and similarly that between consecutive folds 4 on the anode foil is somewhat greater than the width of the cathode foil. Lengths of paper 5 are placed at intervals around one of the foils, typically the cathode foil, to act as separator material for absorbing the capacitor electrolyte and for preventing direct electrical contact between the two foils. The paper is conveniently secured in position by folding it in half around the foil and crimping the opposed paper edges 6 together. Each piece of paper is centred on a fold of one of the foils and extends in both directions from that fold for a distance just greater than the width of the other foil. Then the two foils are interleaved orthogonally, so that portions of the foil not encased in paper protrude from only one side of the resulting stack, while the bare portions of the paper encased foil protrude from an adjacent side. These protruding portions are then welded respectively to anode and cathode tabbing 7 and 8 (Figure 2).

It is preferred top secure the tabbing to the foils by cold welding, and we have found that satisfactory welds can be made provided that suitably radiussed weld tooling is employed so that the foils are sufficiently distorted during the weld operation so as to promote adhesion between the layers. Cold welding of this sort is more generally described in our Specification No. .....(Patent Application No. 8234871 identified by us as G.L. Adams - P.F. Briscoe - A.F. Dyson 3-2-1) to which attention is directed.

In this particular instance 50 thicknesses of foil are welded to a piece of tabbing using tooling designed to produce a corrugated weld of symmetrical profile and uniform thickness. For this purpose the troughs between adjacent teeth of the tooling need to be slightly narrower than the teeth themselves in order to accommodate two weld thicknesses. Tooling used for welding the cathode provides corrugations 9 with a pitch of 0.135", a depth of 0.045", and a welded material thickness of 0.017". Different tooling is used for welding the anode foil to take account of the greater thickness, and in this instance the tooling produces corrugations 10 with a pitch of 0.243", a depth of 0.100" and a welded material thickness of 0.056".

The further processing of the capacitor may proceed along entirely conventionally, with the capacitor being sealed within an aluminium can of generally cylindrical shape. Since the capacitor itself is of generally cuboid shape this is somewhat wasteful of space, but, in comparison with an alternative option of sealing the capacitor within an aluminium can of generally cuboid shape, simplifies the sealing operation involved in spinning the skirt of the can around a base member. A preferred option is to use a plastics can 11 (Figure 3) of generally cuboid shape in which case the skirt of the can is sealed to as gasket in the base of the can by heat welding.

CLAIMS

1. An electrolytic capacitor provided with fan-folded anode and cathode foils that are interleaved orthogonally together with electrolyte-absorbent electrically insulating separator material to prevent direct electrical contact between the two foils.

2. A capacitor as claimed in claim 1, wherein the separator material has the form of a plurality of sleeves around one of the foils.

3. A capacitor as claimed in claim 2, wherein each sleeve is formed by folding separator material around the foil and securing together the opposed edges by crimping.

4. A capacitor as claimed in claim 1, 2 or 3, wherein alternate folds of the anode foil are welded in a single weld to a first piece of tabbing, and alternate folds of the cathode foil are welded in a single weld to a second piece of tabbing.

5. A capacitor as claimed in claim 4, wherein the welds are cold welds.

6. A capacitor as claimed in claim 5, wherein each of the cold welds has a corrugated profile.

7. A capacitor substantially as hereinbefore described with reference to Figures 1 and 2 or to Figures 1, 2 and 3 of the accompanying drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1984.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.